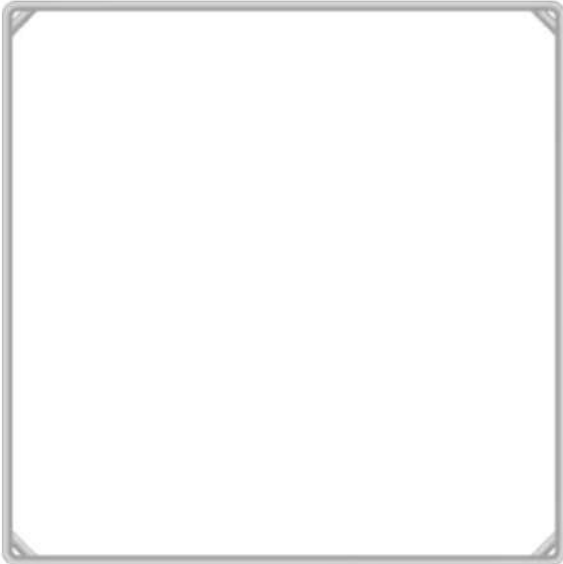


17. Ten amps flow through a square loop where each side is 20 cm in length. At each corner of the loop is a 0.01-cm segment that connects the longer wires as shown. Calculate the magnitude of the magnetic field at the center of the loop.

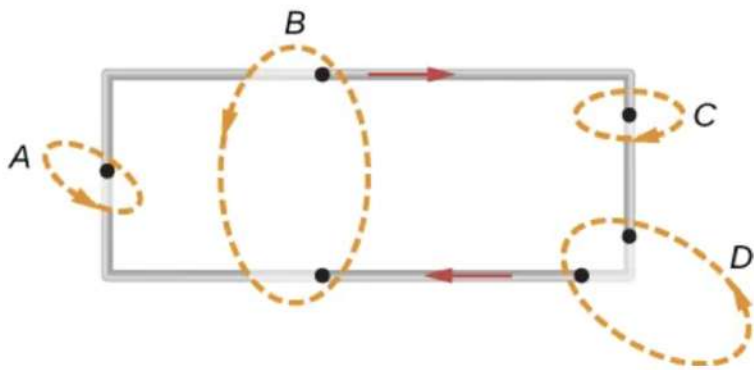


23. The magnitude of the magnetic field 50 cm from a long, thin, straight wire is $8.0 \mu\text{T}$. What is the current through the long wire?

31. Two long, straight wires are parallel and 10 cm apart. One carries a current of 2.0 A, the other a current of 5.0 A. (a) If the two currents flow in opposite directions, what is the magnitude and direction of the force per unit length of one wire on the other? (b) What is the magnitude and direction of the force per unit length if the currents flow in the same direction?

35. When the current through a circular loop is 6.0 A, the magnetic field at its center is 2.0×10^{-4} T. What is the radius of the loop?

41. A current I flows around the rectangular loop shown in the accompanying figure. Evaluate $\oint \vec{\mathbf{B}} \cdot d\vec{\mathbf{l}}$ for the paths A , B , C , and D .



49. A solenoid is wound with 2000 turns per meter. When the current is 5.2 A, what is the magnetic field within the solenoid?

59. A solenoid has a ferromagnetic core, $n = 1000$ turns per meter, and $I = 5.0$ A. If B inside the solenoid is 2.0 T, what is χ for the core material?

$$17.566 \times 10^{-5} \text{ T}$$

23. 20 A

31. a. $F/l = 2 \times 10^{-5} \text{ N/m}$ away from the other wire; b. $F/l = 2 \times 10^{-5} \text{ N/m}$ toward the other wire

35. 0.019 m

41. a. $\mu_0 I$; b. 0; c. $\mu_0 I$; d. 0

49. $B = 1.3 \times 10^{-2} \text{ T}$

59. 317.31